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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LUK, EMMANUEL S

ART UNIT PAPER NUMBER

1722

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/596,549

Applicant(s)

BOOTH ET AL.

Examiner

Emmanuel S. Luk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-22 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-22 and 28-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-4, 7-9, 14-21 and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al in view of Manov et al and Schmidt.

Lin teaches an aluminum substrate thick film heater having ceramic oxide dielectric insulator and the substrates having resistive layers. Lin also teaches the heating element circuit pattern (108) is applied over the dielectric layer (106) that ends in the terminal foils (110) for connection to a power source, an insulative layer (114) is applied over the other layers, and thick film ink (Col. 5, lines 21-39). Lin also teaches the substrates and the circuit patterns:

In FIG. 2 a circuit element is shown applied over a flat substrate. In FIG. 3 a circuit pattern is shown over a tubular substrate. A plurality of other substrate and circuit pattern designs may be implemented. For example, the substrate

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could have irregular contours and the circuit patterns can have irregular continuous traces. (Col. 6, lines 34-40).

Lin fails to teach a trace in pattern that is discontinuous circumferentially and longitudinal slot.

Lin teaches a circuit design on a substrate (Fig. 2) and also a substrate design on a heater body (Fig. 3). Manov teaches teaches the creation of a trace pattern on a heater that is discontinuous circumferentially on the heater body and a slot runs longitudinal to the heater body.

Schmidt teaches a band heater clamp arrangement for an injection molding machine. Schmidt teaches an inner sleeve having an axial slot that extends through the entire length that allows for the inner sleeve to expand and close as temperature rises, thus allowing for the different thermal expansion rates between the inner sleeve and outer sleeve (Col. 2, lines 41-47).

Lin teaches formation of the pattern on both a flat substrate and on a heater body that is cylindrical, the design of the pattern can be designed as desired and to accommodate for features of the substrate.

It would have been obvious to one of ordinary skill in the art to modify Lin with a discontinuous circumferential design as taught by Manov because it compensates the design for the slot that runs longitudinal to the heater body and a slot as taught by Schmidt because it allows for heater to compensate for the thermal expansion of the substrate that is located on the inner sleeve.

In regards to claims 17-19, the dielectric strength of the dielectric layer, the insulation resistance and the thermal expansion coefficients are cause effective variables that can be determined through routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as through routine experimentation in the absence of a showing of criticality in the claimed properties such thermal expansion coefficient, resistance and dielectric strength. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In regards to claim 31, the plurality of traces it would have been obvious to one of ordinary skill in the art to have a plurality of traces for a multiplied effect, in this case for improved heating. *In re Harza*, 124 PQ 378 (CCPA 1960). It would have been obvious to one skilled in the art to find the optimized pattern.

In regards to claims 20 and 21, the respective layer being formed by photoforming, laser etching and abrasive etching is process limitations that are not given weight in an apparatus claims because it does not provide further structural limitations.

4. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov and Schmidt as applied to claims 1-4, 7-9, 14-21 and 28-31 above, and further in view of Riley.

Lin fails to teach the contact is made from gold plated steel.

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Riley teaches a thick film circuit element having substrates and layers that are formed via silk screen (Col. 3, line 67) onto the surfaces of the substrate (12). The substrates can be made of ceramic (Col. 3, line 65), other substrates include stainless steel (Col. 2, lines 65-66) and noble metals, such as gold (Col. 1, line 41) for use in the circuit. Riley teaches the use of a variety of different materials in the substrates, this also suggests use in parts other than substrates including the housing and contact pads, such as a ceramic housing and gold plated steel on the contact pads.

It would have been obvious to one of ordinary skill in the art to modify Lin with contact as taught by Riley because it allows for the desired properties of the contact for the heater.

5. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov et al and Schmidt as applied to claims 1-4, 7-9, 14-21 and 28-31 above, and further in view of Collins.

Lin fails to teach the resistive layer comprises of a resistive trace and a lower-resistance conductive trace.

Collins teaches the formation of a thick film resistor and utilizes a resistive layer and a low-resistance conductive trace:

Each of the networks was fabricated on insulative alumina substrates by direct writing of the resistive line pattern r using commercially available ruthenium-based inks of different compositions (different sheet resistivities), whereby each pattern was written to achieve a different final effective width of the line r for the resistor segments. Both segments of each resistor network were written with one and the same line width. The effective line widths of the low resistance segments were achieved by writing a selected number of resistive lines in a parallel configuration between conductive terminal bars connected to respective conductive terminations. (Col. 6, lines 15-26)

The low resistance segments being the conductive trace, thereby low resistance, that is located with resistive lines (resistive trace) that forms the resistive layer, the patterning allows for optimum use of the resistive layer.

It would have been obvious to one of ordinary skill in the art to modify Juliano with a resistive layer comprised of a resistive trace and a conductive trace as taught by Collins because it allows for optimum configuration for the resistive trace pattern in the heater.

6. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov et al and Schmidt as applied to claims 1-4, 7-9, 14-21 and 28-31 above, and further in view of Osuna-Diaz et al.

Lin fails to teach a detente.

Osuna-Diaz et al teaches a threading (24, 36) that locks the heater (28) into the place in relation to the nozzle. Instead of a detente being utilized to lock the substrate into position, one skilled in the art would recognize other fastening means including threads to hold a removable substrate into position surrounding a nozzle. It would have been obvious for the contacts to be situated so that when the substrate is locked into position that the contact pads would be in contact for the heater to work.

It would have been obvious to one of ordinary skill in the art to modify Lin with threads to place and lock a heater into place surrounding a nozzle as taught by Osuna-Diaz because it allows for the substrate to be removed and replace for ease of maintenance of the apparatus.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Manov et al and Schmidt as applied to claims 1-4, 7-9, 14-21 and 28-31 above, and further in view of Goldwin (EP 0963829 A1).

Lin fails to teach the connector housing having a key for slidably engaging a longitudinal slot in the substrate.

Goldwin teaches an injection molding heater around a nozzle (130) comprising of a thin film heater (132) that has a connector (138), or key, that ensures the heater stays connected to the nozzle (Fig. 14A). One skilled in the art recognizes the above view of the nozzle and heater that the connector would be in a slot of the heater for engagement. The connector and slot also inherently ensures proper alignment of the heater with the nozzle for any desired configuration such as aligning with contact pads.

It would have been obvious to one of ordinary skill in the art to modify Lin with a slot and key as taught by Goldwin because it ensures interchangeable heaters to the nozzle that can be aligned accordingly.

Response to Arguments

8. Applicant's arguments with respect to claims 1-5, 7-22 and 28-31 have been considered but are moot in view of the new ground(s) of rejection.

The applicants' arguments concerning Juliano, Manov, Riley and the cited cases have been considered. However, a new rejection with Lin in view of Manov and Riley deals addresses many of the issues including the use of cited cases and to address the

new claimed structure of thick film ink. The Lin reference is a heater having thick film ink, the layers and the pattern designs that would be obvious over the claimed structure.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel S. Luk whose telephone number is (571) 272-1134. The examiner can normally be reached on Monday-Thursday 7 to 4 and alternate Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-0987.

EL


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